



John Reich Journal

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JRCS

JOHN REICH COLLECTORS SOCIETY
P.O. Box 135 Harrison, OH 45030

The purpose of the John Reich Collectors Society (JRCS) is to encourage the study of numismatics, particularly United States gold and silver coins minted before the introduction of the Seated Liberty design, and to provide technical and educational information concerning such coins.

Annual dues\$15.00

Life Membership\$375.00

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The John Reich Journal is the official publication of the Society and is distributed to all members in good standing. Members are encouraged to submit any articles encouraging the study of numismatics and / or relating to early United States gold and silver coins to the editors. Especially needed are articles containing new information about die marriages, die states of published die marriages, attribution methods, collections, collectors, etc.

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Cover Photos: 1817/13 0101 Capped Bust Half Dollar. One of the most prominent and popular overdates in the Capped Bust Half Dollar series. Speculation is that John Reich made the die and after he left the mint's employ, Robert Scot overdated it for use.

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John Reich Collectors Society

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Editors' Comments

Volume 15 Issue 1 of **The John Reich Journal** is now a reality. There have been many arduous changes in the society over the last year. The transition of records from Russ to our new treasurer, W. David Perkins, has been more difficult than anticipated. We have had to rebuild much of our database and update it for the new membership payments. Hopefully we have developed a system that will serve the membership for many years to come. Should anyone have any questions or comments concerning his membership, please do not hesitate to contact me either by e-mail or regular mail at the P.O. Box.

Who would have thought that in 1986 the fledgling JRCS would evolve into the club we have today? That first 24 page journal was the beginning of a new source for information on the issues of our Federal Mint. The giants of our hobby have been regular contributors to the pool of information published in our pages. Many of the original researchers have since passed from our ranks or have become inactive. In reviewing our first issue of the Journal, most of the authors are no longer contributors. Allen Lovejoy and Russ Logan have passed away and Jules Reiver is no longer contributing to our pages. Sheridan Downey and Robert Stark are still with us and do share information through our pages. The time has come for new collectors to assume the mantle of educators for our society. There are many of you who have wonderful, specialized knowledge of our favorite coinages that have not yet come forward to share your discoveries with the rest of the membership. Knowledge is only useful if you are willing to share it with the rest of the community. Do not let a good idea or discovery go unreported! Numismatics is enriched by each and every discovery, no matter how small or insignificant it may seem. Sometimes a thought shared with another collector is the missing link in his research. Take the time to tell others through the pages of our Journal about your favorite coins. Sharing ideas can be immensely rewarding.

Speaking of rewarding: It is time to announce the winner of the coveted *Jules Reiver Literary Award*. The voting for this year's award was very gratifying. More votes were cast for this competition than for any other since I have been the editor. I am encouraged with the additional participation in both voting and the introduction of new authors to our stable. Every article eligible for the award received votes in the balloting. This attests to the continued interest in all aspects of the Bust Coinages by the membership. It should encourage each of us to contribute an article for future publication for the diverse interests of the membership. This year's winner is a repeat recipient of the Reiver Award. He has contributed many interesting articles for our consumption over the years. His latest submission was a runaway winner attesting to

his ability to inform and capture the interest of his fellow members of the Society. I am continually impressed with his willingness to share the little known facts he has uncovered through thousands of hours of research. I take great pleasure in announcing that Edgar E. Souders has garnered the *Jules Reiver Literary Award* for his article *Capped Bust Half-Dollar Secrets: The Denomination* which appeared in the last issue of the Journal. This, another installment in his continuing series on the half-dollars, ranks as one of the most informative articles written for our Journal. I am certain that Edgar is sincerely appreciative for the support and recognition of our membership. I hope there will be many more submissions from him in the future.

The other ballot issue was the amendment of our by-laws to allow for the formation of specialty sub-clubs as part of our society. The Bust Quarter Collectors Society managed by Dr. Glenn Peterson petitioned to become a part of our organization. The membership overwhelmingly voted to approve the changes to allow for these satellite clubs. Glenn moderates an e-mail discussion on the quarters where collectors can exchange information about their collections. This exchange of information is encouraged to develop articles for future publication in the JRJ. Anyone interested in participating in the quarter society can contact Glenn through the PO Box. There is an additional fee of \$7.50 added to your normal dues of \$15 to cover additional mailing and stationery costs.

We would also like to remind you that we still have a quantity of the half-dime and dime books available for sale. The stock on the dime books is getting very low and will soon be sold out. After that you will have to rely on obtaining them from secondary sources. The cost is \$75 for either book, or the pair for \$125 including shipping. If you have any interest you can order them by sending a check made out to JRCS for the appropriate amount and send it to me at the PO Box. Please remember to include your shipping address on a separate note in the envelope.

Do you have collecting friends that are not members of the Society? Ask around and suggest they give us a try. **The John Reich Journal** should be on the shelf of every collector who has an interest in the Federal Coins. The amount of information contained in our pages is well worth the cost of membership. Sign up a new member today! Applications are available by mail or at our website www.jrcs.org.

We are planning a special presentation for our annual meeting at the ANA in Baltimore this year. Craig Sholley, a well known researcher in early Mint methods, will be our guest speaker. Craig will be entertaining us with information he has gleaned directly from first-hand research of the Mint archives. His presentation will be followed by a question and answer period. Plan on attending our annual meeting in Baltimore. It will be well worth your time!

Attention Bust Quarter Collectors! It is time to submit your inventories for inclusion in our census. Glenn Peterson will be compiling the quarter census for the society and needs to know about your coins. Please send us the information about not only your front line collection, but also of your die states and duplicates. The easiest format is date, variety, grade. Members of the Bust Quarter Collectors Society please send updates and/or confirmations of your current inventories. You can send them to me either at the P.O. Box, or by e-mail at karoleffs4@aol.com. If sending them by electronic media, please have them saved in Microsoft Word. I will confirm receipt of your inventory when I am able to read the file. If there is a problem, I will let you know. Please send your list as soon as possible as it takes a great deal of time to construct the initial census.

This issue of the Journal has a wide range of fascinating articles for your inspection. Craig Sholley has agreed to write a three part series of articles about the early Mint. The first of which is included in this issue. I have also written an article covering my experiences at the Logan sale last November. The biggest treat for the membership should be our lead article. Russ Logan had been working on an article on the proof only marriages in the Capped Bust Series. We are delighted to be able to present to you the results of his research. The Bust Dime census is also included in this issue of the Journal. We hope the dime collectors can extract some meaningful information from Charlie's hard work.

You will also find an insert in this Journal from Edgar Souders announcing the publication of his current work. He has graciously agreed to donate \$5 for each one sold through the Society. The CD is wonderful even I have been able to use it!

Now, roll up your sleeves and get ready to be entertained by some of the best numismatic articles to be presented this year.

Attention Bust Quarter Collectors

It is time to submit your current inventories

for the quarter census

Please send them to me in the following format:

DATE-VARIETY-GRADE

Please include die states and duplicates

Proof Only Die Marriages of our Federal Silver Coinage

Russell J. Logan

Are there a few coins that you have seen that are simply unforgettable? Even if it was twenty-five years ago, you probably remember the circumstances, the faces, as if it were yesterday. Was the coin a knockout because it filled the last hole in your collection, a mint error that took the next hour to figure out, or was it just a well struck, well preserved specimen that had to have received special handling by everyone who handled it during the past two centuries including the mint employees who were responsible for creating it?

Two such coins come to my mind when such a question is posed. I had planned a few days of "just coins" focused around the Bareford Sale in New York City in the fall of 1981. All the Dime Book authors were attending the sale and we had scheduled a couple of dime book planning sessions in Allen Lovejoy's midtown Manhattan office. Auction lot viewing was scheduled early to avoid the crowds. Allen had attributed all the Bust dimes to our unpublished nomenclature and had given each of the authors a synopsis of each lot.

Even so, I was not prepared for the quality of Bust dimes (and Bust half dimes) that were in that sale; Bareford had one thing in mind when he purchased a Bust dime, and that was quality. He wanted the best grade coin he could find, and rarely did he compromise. He did not collect by die marriage, but he did have many of the "Red Book" varieties. I had been forewarned that lot 170, an 1827 Bust dime, was a show stopper, but I was not prepared for what I saw. The fields were mirror finished and the devices were cameo; it looked like nothing I had ever seen before minted with a screw press. Call it a proof; call it a presentation piece; call it anything you wish, it was in a class by itself. As my numismatic exposure increased, it would be joined by a select few other pieces. Unfortunately, Allen had misattributed the coin as a JR-9, so none of us recognized it as a JR-10 proof only issue until after the sale. Ironically, Stack's, Dave Davis and I also misattributed another "proof only" silver coin (lot 386) in that same sale: the 1832 dash date half dollar with the 1833 Reverse L, now known as Overton-123.

It would be fifteen years later before I saw my next (and last) drop dead silver Federal coin. It was the same die marriage as the misattributed Bust half in the Bareford Sale (1832 O-123), but this one was in the Eliasberg Sale. It was even more incredible than the 1827 JR-10 dime; it was lot 1881 and is the finest Bust half dollar that I've ever laid eyes on. Words defy its description; even Q. David Bowers struggled with its catalog narrative, short changing the coins description (he gave it only 3/4 of a page description). Its hammer price of \$205,000 surpassed the finest known 1817/4 half dollar by \$15,000!

In addition to the above two coins, there are four other proof only silver Federal coins. The original 1827 quarter is probably the earliest known of all the proof only silver issue coins. Although the story of Joseph J. Mickley obtaining four 1827 quarter dollars directly from the mint in 1827 is highly speculative, there are auction records dating from 1863 which establish the charisma of this coin.

And there are the three Crushed Lettered Edge half dollars which share the same reverse as 1836 Overton Reverse E. These three coins were struck in a closed collar - which “crushed” the edge lettering during the strike - with three unique obverse dies dated 1833, 1834, and 1835. Both the obverse and reverse dies used for these three die marriages use “beaded” border dentils instead of the more common “elongated” dentils. The late John Pittman was responsible for rekindling the interest in these coins when he displayed his set at the Cincinnati ANA Convention in 1988. Not only have these coins been assigned Overton numbers (1833 O-116; 1834 O-122; and 1835 O-111), but the Red Book makes specific reference to the beaded border reverse die used for all these die marriages.

The Coins

Tracing these coins throughout history is like meeting the Who’s Who in American numismatics. Every major collection sold in the 20th century is represented by at least one example. On the other hand, because we are attributing more and more of our earlier silver coins, we are finding those which escaped into circulation. It is very disconcerting how poorly we have cared for our most prized coins during the past 175 years. With the possible exception of the 1835 CLE, every coin listed in this article has had at least one defector to circulation.

1827 JR-10 Dime

Proof Examples

1. Proof 55 - Norweb; National Numismatic Collection, Smithsonian Institution
2. Proof 67 - Cleneay 12/19/1890:1498; James Kelly; Bareford:170; Lovejoy:85
3. Proof 65 - Auction ‘89:540
4. Proof 63 - J. C Morganthau 10/39:469; Starr:354; Logan
5. Proof 63 - F.C.C. Boyd:476; 1946 ANA:243; Stack’s 6/00:596

Impaired Proof Examples

6. XF-40 - Greer 1/97; Briggs; D. Davis
7. VF-30 - Sherrill 12/98
8. F-12 Damaged - e Bay 1283008945
9. G-4 - Kubacki; Greer; Sherrill; Scuderi



1827 JR10 Proof
Bowers & Merena Logan Sale
Lot 2072 Ex: Starr Collection
Photo courtesy of Bowers & Merena

1827 B-1 Quarter

Proof Examples

1. Proof 63 - National Numismatic Collection, Smithsonian Institution
2. Proof 63 - Parmelee; Green; J. A. Stack
3. Proof 63 - Garrett
4. Proof 63 - Levick; R. C. Davis; Farouk; Pittman
5. Proof 63 - Reichardt; Norweb
6. Proof 63 - Cleneay; Newcomer; Kern
7. Proof 63 - Boyd; Neil; Miles; Speir
8. Proof 60 - Granberg; Woodin; Yale University; Hawn; Robinson; Meyer



Impaired Proof Example

9. XF-40 - Petry; Clapp; Eliasberg

1832 O-123 Half Dollar

Proof Examples

1. Proof 60 - National Numismatic Collection, Smithsonian Institution
2. Proof 68 - Parmelee; Clapp; Eliasberg:1881
3. Proof 63 - Allenberger:880; Bareford:386; Bennett; Schertz; Crowley; Logan

Impaired Proof Examples

4. AU-50 - Ivy 1982; Keen; Carter; Dosier; Meyer
5. XF-45 Corroded - Greer 2001; Tidwell



1833 O-116 Half Dollar

Proof Examples

1. Proof 63 - National Numismatic Collection, Smithsonian Institution #1985.0441.252
2. Proof 65 - Allenberger:890; Pittman:1502
3. Proof 65 - Picker 1958; Norweb:3015; Logan

Impaired Proof Example

4. XF-45 - Merkin 1960; Cox:1241; Sloss (B&M 8/98):191; Tidwell

1833 0116 Crushed Lettered Edge Proof
Bowers & Merena Logan Sale
Lot 2707 Ex: Norweb Collection
Photo courtesy of Bowers & Merena

1834 O-122 Half Dollar

Proof Examples

1. Proof 63 - National Numismatic Collection,
Smithsonian Institution #1985.0441.261
2. Proof 64 - Kosoff ANA '49:1487; Pittman:1506; Tidwell
3. Proof 63 - Allenberger:904; McPherson:887;
Empire Sale (Stack's):1381; Merkin (1975);
Stacks 12/94:887
4. Proof 63 - Brand-Lichtenfels:1311; Starr 10/92:542



Impaired Proof Example

5. XF-45 - Kagin's 8/83:2477; Logan

1835 O-111 Half Dollar

Proof Examples

1. Proof 63 - National Numismatic Collection, Smithsonian Institution #1985.0441.268
2. Proof 65 - Allenberger:917; Pittman:1508; Tidwell
3. Proof 66 - Earl 6/12:2955; Clapp; Eliasberg:1900
4. ?? - Kagin's 5/46; Empire Sale (Stack's):1340

1834 0122 Crushed Lettered Edge Proof
Bowers & Merena Logan Sale
Lot 2741

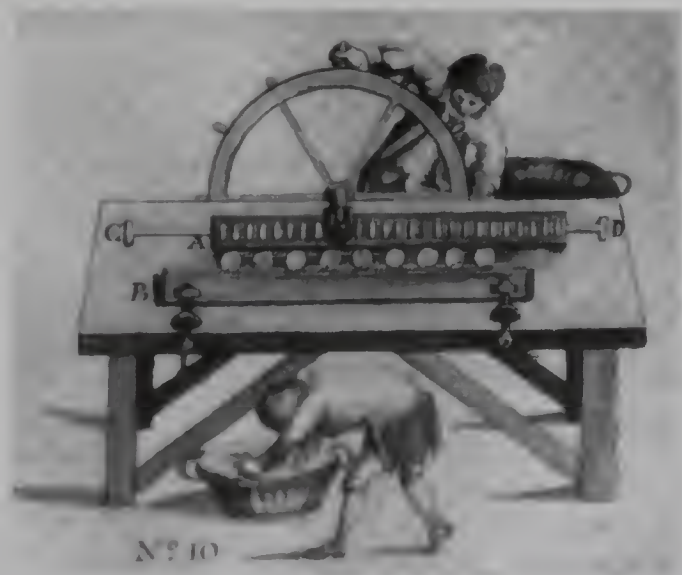
Photo courtesy of Bowers & Merena

The Collectors

Probably more interesting than the coins themselves, are the collectors who pursued these proofs. Granted, sixty years ago, you could probably not get five numismatists to agree on which coins were proof only issues, but there were collectors out there trying to assemble a set. The following chart (*next page*) reveals that it was the Allenbergers, the Pittmans, the Norwebs, and the Clapps who had the eye and the patience to pursue these pieces. But only the Smithsonian Institute, in the history of collecting Federal coinage, has attained the perfection of owning all six examples.

	1827	1827	1832	1833	1834	1835
	JR-10	B-1	O-123	O-116	O-122	O-111
Smithsonian	1	1	1	1	1	1
Allenberger			3	2	3	2
Pittman		4		2	2	2
Tidwell			5	4	2	2
Logan	4		3	3	5	
Clapp/Eliasberg		9	2			3
Norweb	1	5		3		
Starr	4				4	
Empire					3	4
Cleneay	2	6				
Bareford	2		3			
Meyer		8	4			
Boyd	5	7				
Granberg		8		?		

Chart 1 - The individual figures in the body of the Chart refer to the numbered specimen from the text.



1836 (B-2) Very Late Die State Quarter

Aaron N. Didich

According to *The Early Quarter Dollars of the United States 1796-1838* by A.W. Browning and updated by Walter Breen, the 1836 quarters of varieties 2 and 4 share a common reverse. The obverses of these two varieties are peppered with die cracks as are the reverse, which can make a quick identification a bit tedious.

The description in Browning for B-2's reverse reports cracks in two places: "diagonally across from top to bottom, through F in OF, over eagle and the two lower olive leaves; second crack extends from left edge to eagle's wing through high part of U in UNITED." Browning goes on to describe B-4 as the same as B-2 but "a second crack (from left edge through U to eagle's wing) extends across the wing to shield." This additional crack is not readily visible on any of the plate pictures and may be missed as a diagnostic.

This was the case for me while attending the Central States show in Columbus, Ohio. This pronounced crack across the wing prompted me to just purchase the coin thinking it was the R-5 B-4 version and sort things out later. Closer examination verified the B-2 obverse as described in Browning.

A description was mailed to Glenn Peterson who is working on a new tome for bust quarters. His notes did not contain the new VLDS variety and attempts to verify it by his search of dealer stock at the Sharonville (Cincinnati) Show did not uncover any pieces. Subsequent searching at the ANA Baltimore Show did yield examples.

Simply put, this VLDS find has confirmed a new die state and has placed the origin of the reverse die crack across the left wing of the left side of the shield as originating on the B-2 variety. Please note the accompanying picture and check your stock to see if you have this variety.



The Logan Sale

Bradley S. Karoleff, NLG

The passing of our founder and treasurer Russ Logan affected everyone in numismatics in one way or another. Many of us lost a friend and mentor. The club lost one of its' founders, visionaries and driving forces. Numismatics lost one of the premier researchers of Federal Coinage. The ripples of the loss of Russ would expand to the very edges of our hobby.

The Logan family chose Bowers and Merena to auction Russ' collection of Federal Coinage. Mark Borckardt was the primary cataloger of the collection. This sale would prove to be the event of 2002 for the collectors of bust die marriages emanating from the US Mint. No one knew exactly what would be in the sale. Many of us had seen bits and pieces of Russ' holdings in the past, but the full extent of the collection remained a mystery to all but a select few. We all waited anxiously for the catalog to be mailed.

The catalog arrived a couple of weeks before the sale. I was filled with melancholy as I read the pages thinking of my departed friend. It was a depressing task to review his collection thinking I would have loved to wait another few decades to see his coins dispersed. The catalog contained the usual profile of the consignors presented by the auction company. Mark Borckardt wrote a preview to the Logan collection talking about Russ' career as a numismatist and the collection. He included a review of all the articles Russ wrote for **The John Reich Journal**. This was followed by tributes to Russ written by John McCloskey and by me. There were many magnificent rarities within the pages to view with only a thought of owning them. There were, however, many other lots that would be affordable. Many more than I could take home for myself. I was also representing other collectors that could not attend the sale. I had to mark my catalog for each collector I was representing. Flight and hotel reservations were made and the wait began.

In the ensuing days, I was able to review the pages of the catalog many times. Certain coins repeatedly distinguished themselves as jewels of the collection. I could not wait to be able to view them in person. There were many rumors of who would bid on what coins and the amounts they were willing to pay for the privilege of ownership. The posturing continued right up to the moment of the sale. It was interesting to listen to all the statements trying to weigh them as fact, or fiction. I became captivated by a few of the coins offered. I marked my catalog with the hopes of obtaining a couple of coins for my own collection. I dearly wanted a plate coin from the half-dime book for my set, as well as a few half dollars to improve my collection. Russ' interest in the edge varieties of the half dollars intrigued me to bid on a few lots merely for the edges. No one loved the edges of their coins as much as Russ. I only hope that someone takes up the mantle of edge expert now that he is gone.

I arrived in Baltimore on Thursday morning November 7th and proceeded to the convention center to view the lots. I was able to secure a seat at the viewing table as I arrived and began

the daunting task of looking at all the coins from Russ' collection. The coins were divided into numerous boxes so many prospective bidders could view the lots at the same time. Each box was presented to us after inspection to see that it contained every coin as indicated on the outside. After careful examination the flips were returned to the box and an employee double checked to see that each piece was again present. It took all day Thursday for me to view the entire collection. Each box contained many wonderful specimens that Russ painstakingly collected throughout the years. Audible gasps and whistles were heard many times coming from the collectors viewing the collection. Everyone was amazed more than once with the quality, rarity or neatness of the coins. Russ loved errors, and amassed a wonderful variety of them in his collection. The number of off-center half dollars made them look almost common until one realized that there are very few ever offered for sale. Russ had been buying almost all of them for some time!

After finishing lot viewing there was time for a quick dinner before the evening session of the auction. The half-dime collection was the first to come to the block. The room was full of tension created by the anticipation of the collectors there. Everyone had a long wish list of coins they wanted to add to their cabinets. No one knew for sure who might be his competition on any individual lot and misinformation circulated freely. The time had come to begin the sale. Russ' son Rob and his wife were in attendance to see the collection sell. After a few introductions and reviewing the terms of sale it began with a 1795 half dime. The three pre-turbs sold quickly and then the coins we all were waiting for began to sell. Lot after lot contained high-grade specimens of the Capped Bust Half Dimes, many of which were plated in the book Russ wrote with John McCloskey. Au's were selling for Uncirculated prices, and the rare varieties were bringing great prices. The first major rarity to sell was the 1829 LM8 in AU55. It was hammered down at \$2200 after opening at only \$700. It was followed a few lots later by an LM11 in AU50 for \$1300 and an LM12 in AU58 at \$1500. The year of 1830 had its' own highlights. They included a LM5 in AU55 for \$2800, LM10 in AU50 for \$850, and a LM11 in VF20 showing an incomplete planchet punch mark for \$1100. The extremely rare LM9.1 in AU58 at \$2600, and the LM9.2 in XF45 for \$2200 were the other significant 1829's. 1832 included a LM10.4 in MS63 with a retained cud on the reverse that brought \$1700.

1833 was the year everyone was waiting for as it contained some of the most desirable coins in the collection. The first of the rare varieties was the LM2, which was originally discovered by Russ. This piece was the discovery coin as well as being the illustration example for the book. It graded XF45 and was hammered at \$750. The LM3.5 followed a few lots later; it was also graded XF45 and had a large retained cud that nearly obliterated NITE of United. This interesting die state opened at \$140 and was advanced to \$1800 with spirited bidding from many participants. The time had finally come for the highlight coin of the half-dime series, which was the 1833 LM5 in MS62, the finest known of this very rare variety. It is a wonderful eye appealing coin and would be the highlight of the new owners collection. Rumors had flown as to the possible price that was to be paid for the coin. Now we would find out the results. The coin opened at \$2900 and advanced quickly to the \$8000 hammer price.

The proud new owner was overjoyed at his good fortune. Everything else now seemed anticlimactic, but many wonderful coins remained to be sold. The next lot, a LM6 in MS62 brought \$2400 after opening at \$500. Another interesting die state, an 1835 LM5.2 with a large die crack through D and S2 in AU50 sold for \$480. An 1835 LM9.2 with the large die crack across the top of the scroll in AU50 was sold for \$1700! The highest-grade coin of the collection, an 1836 LM1.2 in MS65 brought \$3600. 1837 was well represented with a LM2 in AU55 selling for \$1300 and the rare LM3 in AU50 bringing \$1900. This brought the half-dimes nearly to an end with the quarters selling next.

Russ' quarters were not the quality of the half-dimes, dimes or half-dollars. He, obviously, had not spent the resources necessary to assemble a world-class set of quarters, yet. He did, nonetheless, have some very nice original pieces to represent the Browning numbers. The 1804 B1 was a wonderful F12 that sold to the book at the surprising price of \$3200. Russ' love for errors was evident in the off-center 1818/5 B1 graded MS60! It opened at \$1900 and eventually sold for \$4400. The very scarce 1819 B4 in XF45 sold for the strong price of \$2600. Another off-center coin, the 1821 B1 in G6 was sold to a very appreciative buyer for \$370 after opening at \$100. The 1822 25/50C B2 in VG8 was the next interesting lot, which sold for \$2600. The highlight of Russ' quarters was the rare 1823/2 B1. It is rated as a rarity 6 with only about 20 pieces accounted for in all grades. The coin is a very attractive VG10 with no problems, a perfect specimen for any collector to proudly add to their cabinet. The bidding opened at \$4500 and was contested on the floor between two prominent collectors. After a few bids one of the collectors advanced the bid to 10K, not wanting to go through the motions of bidding each increment. The final hammer price on the coin was \$12K, going to the collector who previously advanced the bid. Late die state coins continued to show their strength as an 1825/4 B3 in AG3 with a large cud covering most of UNITED sold for \$220. The error coins also showed their popularity with an 1833 double struck B1 in AU50 selling for \$3800, and the 1837 B5 MS66 double struck from the Eliasberg collection which brought \$6000.

The few Bust Dollars that Russ had accumulated were sold next. There were no outstanding coins represented in the collection. A 1795 BB21 in F12 scratched with a silver plug sold to the book at \$1500. A three leaf 1795 BB27 was hammered down for \$2800 and a 1798 BB92 in XF40 sold for \$1800. Immediately following the dollars was the 1836 first steam press medal Julian MT20 in VF25, which sold for \$400 to the book.

Russ was an ardent student of the edges of our Federal Coinage. His exhaustive studies have been published in numerous issues of **The John Reich Journal** and in the **1986 Coinages of the Americas' Conference** proceedings published by the American Numismatic Society after their conference where Russ presented his paper. This 1986 conference was held at the Society's headquarters in New York and is required reading for the student of American Federal Coinage. If you do not own a copy please do yourself a favor and order one today! The final lot of the Thursday evening session was a collection of Russ' edge mirrors, which he engineered to view and photograph the edges of the individual types of Federal Coinages.

Bowers and Merena had agreed to sell this lot and donate the total proceeds to the treasury of The John Reich Collectors Society. The bidding opened at \$200 for the group of mirrors. There was very spirited bidding taking the lot to the unheard of price of \$2000! Congratulations were traded around the room for the lucky new owners of the coins. There were some disappointments, but most were set off by the successes of the bidders. This ended a very interesting evening of bidding. One only had to wait a few hours for the beginning of the dimes and half dollars.

After short night's sleep and an early breakfast it was back to the convention center for the Friday morning session where the dimes would be sold before the halves came to market. There was still quite a buzz from the evening sale. Collectors were planning on what to spend their remaining funds on in the upcoming sessions. Russ' collection of dimes was second only to his half-dimes in quality. Many coins could trace their provenance to the Lovejoy and Subjack collections (other authors of the dime book, which are still available for \$75 from the Society). There were many new faces in attendance, collectors who were only interested in the dime section of the sale. The first lot, a 1796 JR5 in XF45 was sold for \$6500 setting the tone for a very successful dime session. The following lot, a 1798/7 in AU58 that could trace its' pedigree back to the Lovejoy and Bareford collections sold for a whopping \$36K! An 1800 JR2 in XF45 followed at \$4200 and the exceptional 1801 JR2 in AU50 brought \$13K. The 1803 JR4 was sold a few lots later at \$4200 and the 1804 JR2 in VF30 made it to \$12K. We were off and running!

The Capped Bust Dimes followed and soon built some impressive strength on their own. An 1814 JR1 VF20 struck 15% off-center sold for \$2000. There were so many nice coins it was hard to decide what to bid on! The year of 1820 included a JR1 in AU50 selling for \$1700, a JR6 in AU58 for \$1400, the JR10 in AU50 sold for \$1000, and the rare JR12 in MS60 brought a relatively tame \$4000. The very rare 1821 JR2 in VF20 was a very beautiful and conservatively graded coin, which sold for \$3200. The 1822 JR1 in VF25 sold for a strong bid of \$2600. The 1823 JR3 dime counter stamped with the Lafayette head sold for \$1100. One of the highlights of the collection was Russ' 1825 JR2 obverse brockage dime, which appeared on the cover of **The John Reich Journal** for volume 8. It is a wonderful error coin without equal, an amazing sight to behold. The bidding began at the ridiculous price of \$2400 and proceeded quickly to the hammer price of \$18K! The sister coin, an 1827 JR1 reverse brockage was up in a few lots. It opened at \$1600 and eventually sold for \$9K. Another highlight of Russ' holdings was the 1827 JR10 proof dime. Russ was very proud of this beautiful piece. It is the fourth finest known trailing only a PF67, 65, and 63. The bidding opened at \$3000 and eventually made it to \$15K. Another major rarity found an appreciative new home. The next major rarity to sell was the 1829 curl base 2 dime, JR10 in G4. After opening at \$900 it sold to the book at \$2150. The next highlight coin in the sale was the 1833 JR3 graded MS63! Russ had obtained this coin a few years earlier at the 1999 ANA convention. It was the Subjack coin and may be the finest known for the variety. It sold for the relatively bargain price of \$3800 to a very appreciative buyer. Another 1833, the JR7 in AU58 was bid to \$2200.

Russ loved late die state coins, especially ones with cuds. He had an 1834 JR2 in VF20 with a large cud covering A1 to F on the reverse. It began at \$120 and finally sold for \$500 in spirited bidding. The dime section of the sale ended with an 1863 Fuld 117/420 civil war token struck over an 1837 JR4 dime in AU50, which sold for \$2500.

There was a short break to catch our breath before the half dollar section of the collection. Many congratulations and regrets were exchanged during the break. Some collectors that were only interested in the dimes gathered their notes and exited the room. For many of us, the real fun was ready to begin. I started to feel sorry for the collectors that were interested in all of the series. Their wallets were surely depleted by now.

Russ' Pre-turb half-dollars were, again, a sideline compared to the Turban collection. There were no major rarities, or exceptional coins available other than the double struck 1795 O116, which brought \$2600. It was not a very pretty coin, but the striking abnormality made her a beauty in Russ' eyes. The exceptional errors were yet to come. Russ had previously, in the 1970's, purchased the error collection of his mentor, Stu Witham. There were amazing pieces that had not been on the market for decades. Some may not make another appearance in public sale for another generation. There were also a multitude of edge abnormalities in the upcoming lots. Russ paid particular attention to the edges of his Turban Halves. Many collectors from all over the country would send him unusual edge varieties as they found them to add to his collection. The true rarity of these edge errors, as well as the striking errors, was undermined by the quantities in which they were represented. It took a lifetime of concentrated searching, and luck, to uncover these pieces. I doubt another collection like it will be formed in our lifetime.

The Bearded Goddess was the first Turban to sell. She graded F12 and was lightly cleaned. The new owner paid \$650 to add her to his collection. The O113 was a beautiful originally toned XF45, which was hammered at \$1200. The first R5 to be offered was the 1808 O110. The buyer received a bonus, as Russ' coin was a flip-over double strike error, which graded XF40. It was bid to \$3100, which was a harbinger of the prices to be paid for the exceptional errors. The next lot was another R5, the 1809 O101 that was struck off-center. It graded VF30 and it sold for \$1600. The next spectacular error was another R5, the 1809 O112. The new owner affectionately called this coin the '09 O124, as it was a magnificent double struck coin with a 90-degree rotation. Each strike was clearly visible and it is one of the greatest errors one could own in the Capped series. Bidding opened at a reasonable \$2600 and advanced to \$13K! The rarest die marriage for 1809, the O113 in XF40 sold to a mail bidder for \$3800.

Russ really loved the off-centered halves. One of the pieces in his collection that was struck the most off was the 1810 O102 in F15. It was 22% off-centered, (those interested in knowing more about how Russ determined the percentage of off-centering on these errors are invited to refer to his article *Off-Center Bust Half Dollars: A Definitive Description* found in whole

number 28 of **The John Reich Journal**) purchased, as many of the errors were, from Stu Witham. The coin was eventually sold for \$2700. Another wonderful off-center half, the 1810 O109 in VF20, struck off 12%, sold for \$2600. My favorite off-center half was the 1813 O110a in XF45. It was a perfect problem free coin, a rarity for error coins (they tended to become pocket pieces for conversation items). This beauty opened at \$3110 and sold for \$8000.

One of the really underrated errors in the sale was the 1812 O103 unlettered edge half in AU58. Unlettered edge half-dollars are very rare, with very few being ever offered for sale. This one was not only a rare error but a wonderful coin as well. The new owner should be very happy with his purchase at \$2800. In my opinion, one of the best buys of the sale.

Russ also was interested in other Mint products relating to the Capped Bust Half Dollar series. He obtained a few interesting pieces that have been listed in the pattern books of Judd and Pollock. The first of these to sell was the 1813 Brass restrike listed as Pollock 6205. This went to a new home for \$11K. Another of these ultra rarities, the 1814 Platinum half-dollar was soon to come. It was a real thrill to see and hold this piece of numismatic history in my hands during the preview. The pedigree on this piece went back for over a century including R. Coulton Davis, Virgil Brand, and Dr. Judd. The opening bid was \$17K and it came to rest in a new collection for \$44K. Later in the sale, another of these "patterns", the 1822 Pollock 6215 Uniface copper impression sold for \$4400. Interested readers are invited to review Russ' article *Capped Bust Half Dollar Patterns and Related Issues* found in whole number 37 of the JRJ.

One of the R6's in the sale, the 1817 O104 in XF40 was sold for \$8000. This was the plate coin for the third edition of the Overton reference on the halves. The year of 1817 also included another nice off-center strike. The O105a in F15, struck 18% off went for \$1950, seemingly a bargain compared to other off-centered strikes.

Many wonderful, interesting coins were sold between the lots I have chosen to reference. Everyone with even a passing interest in the Bust Coinages of the US should obtain a copy of this catalog. It will be a core reference for the series for many years.

One of the wonderful, condition census, coins in Russ' collection was the rare 1826 O103. His coin graded AU55 and was sold to a serious specialist for \$3000. This was soon followed by an 1827 O118, triple struck! This neat error sold for \$2800. 1827 is the year that also includes many rare marriages. Some of the highlights are: O122 VF25 at \$800, O123 VF25 for the bargain price of \$220, O124 in AU50 for \$2500, the O127 VF30 for \$1400, the R6 O137 in XF40 for the bargain price of \$8000, O144 AU50 at \$1100, O145 VF30 \$800, and the R7 O148 triple struck for \$10K. The O148 die marriage has an interesting history. Most of the known specimens are multiply struck error coins. For more information please refer to Russ' article *Stop the Press: 1827 O148* in whole number 40 of the Journal.

Another of Russ' passions was the identification and study of remarriages. This is the mating of a pair of dies to make coins two different times interrupted by the subsequent issuance of a new marriage using one, or both, of the previous dies. This practice was rampant in the issuance of the half-dimes as documented in the book written by Russ and John McCloskey (available from the society for \$75). There are very few documented remarriages for the half dollar series. The rarest identified, so far, is the 1828 O123. The main feature found on most of this rare variety is the "railroad tracks" under the eagles' left wing. Some early die states do not show this damage to the die and they sell for far more than their later die state counterparts. Russ had one of each in his collection. The early die state coin graded XF45 and sold for \$3800. The later die state with the "tracks" in VF30 sold for \$1400.

The largest off-center strike in Russ' collection was the 1829 O115, which was off an incredible 45%. The planchet was pitted, but that problem was far overshadowed by the impressiveness of the error. It sold for \$8000.

Another of the R6 varieties, the 1831 O120 in VF25 sold soon thereafter. It was lightly cleaned and some scratches were tooled out of the field. This tooling apparently scared most of the bidders as this extremely rare marriage (approximately 20 known) sold for \$3400. In my opinion another one of the best buys of the sale.

Russ was also very interested in the proof issues of the early Mint. He obtained almost all the proof only die marriages made for all the capped series (see his article earlier in this issue, *Proof Only Die Marriages of our Federal Silver Coinages*). The first of the half dollars in proof was the 1832 O123. It was graded PF63. It was a highlight of my collecting lifetime to examine this wonderful specimen. This coin had previously resided in the famous Bareford Collection. The final bid on this coin was the princely sum of \$42K. The next proof only marriage offered was the 1833 O116 crushed lettered edge half-dollar in PF63. This is one of the famous experimental strikes that were made at the same time as the 1804 dollars (see **The Fantastic 1804 Dollar** by Newman and Bressett, and Russ' article *The Crushed Lettered Edge Bust Half Dollars of 1833-36* in whole number 14 of the JRJ). This particular coin had once resided in the famous Norweb Collection. It was sold to the lucky buyer for \$38K. The last of the proof only varieties was the 1834 O122. It was graded PF45, as it had seen some light circulation during its lifetime. It is the most common of the three crushed lettered edge half-dollars, and was sold for \$18,500.

The sale was coming to an end, but two important errors remained to be sold. One of the most interesting of the sale was the 1835 O103, which was double struck. The interesting thing about this piece was the prominent eagles head, which appeared at 6:00 on the reverse rim. This unusual error was sold for \$6000. Soon thereafter an 1835 O107 VF20, 16% off-centered half sold for \$4000.

The Logan Collection was now history, dispersed into the hands of many of Russ' friends and colleagues. Each of us present had obtained a part of Russ' collection to add to our own. We obtained a tangible reminder of his passion for excellence and enjoyment of this hobby; we became the current curators of a few small pieces of history adding our provenance to those who previously owned them.

It was an exhausting undertaking one endured with a heavy heart. Everyone present would have gladly traded the experience for Russ' continued companionship at these conventions. But, reality differs from our hopes and wishes. We all dealt with Russ' passing in different ways. His sale became part of numismatic history, just as the famous collections of the past that housed many of the coins he obtained. The sale would have to be considered successful as the price realized neared \$1 million dollars. Mark Borckardt provided me with the following breakdowns by denomination: Half-Dimes \$94,587.50, Dimes \$232,684.10, Quarters \$69,868.25, Half-Dollars \$514,664.10, Dollars \$18,216.00, Mint Medal \$460.00.

Russ collected an amazing 728 of a possible 741 marriages in the Capped Bust coinages of the US Mint. It will be another lifetime, if at all, before anyone is able to duplicate this incredible feat. The collection was a fitting tribute to the collector. The hobby will miss you dear friend, may you rest in peace.



1829 LM 7.2
Logan Sale Lot 1713
Logan/McCloskey Plate Coin



1830 LM 1.1
Logan Sale Lot 1732
Logan/McCloskey Plate Coin



Bust Dime Census

Charles D. Horning, D.D.S.

More than 6 years have passed since JRCS has published a dime census. During that time, a number of events have occurred that have impacted numismatics and JRCS in particular. Most noteworthy and most devastating was the loss of our dear friend and mentor Russell J. Logan. As this census will attest, his influence will be permanently bound to our organization.

A second event, more than likely reflected in the following census, was the auction and subsequent distribution of Russ' numismatic holdings by Bowers & Merena Galleries November 7-9, 2002. As many of us imagined, but no one knew for certain, Russ' collection of Federal Bust Coinage was not only virtually complete by die variety but also deep and intriguing in regard to die states, die remarriages and minting anomalies.

As a continuing testament to the research prowess of the 5 authors of **Early United States Dimes 1796-1837**, only one new variety has been discovered since our last census in 1996. Brian Greer discovered a new 1796 variety having a previously unknown obverse die paired with reverse D to create a new marriage that will be designated JR-7. A comprehensive article describing this new variety will be published in a future issue of our Journal.

You will also notice on the following pages that an expanded format has been incorporated for the Dime census. We hope it will be more informative and user friendly.

In addition, we have included 3 landmark Bust Dime collections that have appeared previously but have since been distributed (Lovejoy, Subjack & Logan). In each case, grading for these collections has been taken directly from the specific auction catalogs. It was our desire to create a permanent reference record for our Society's benefit.

Through numerous conversations, and by observations at coin shows, we have noted that the availability for properly graded dimes with original surfaces has diminished significantly. It is now not unusual for an attractive dime to suffer both from grade inflation and from price inflation. Even more surprising, we note that a dime graded AU or better is almost always encased in plastic - you know how nasty those thumbprints can be! Coin "Doctoring" or in PC parlance "curating" has become commonplace. Though widely discussed and occasionally vilified, the practice seems well entrenched.

While our census is as comprehensive as we can make it, our format only allowed the top 15 collections to be individually listed. However, 22 collectors did contribute inventories to be listed in our Totals section. Obviously, many individuals who own dimes are not part of this report. Therefore, conclusions drawn from our findings regarding "condition census" coins and overall populations must be considered suspect.

The Draped Bust Dime Census is rather self-explanatory. With the permission of collectors 002 and 006, we have listed their collections as references, even though there have been no changes to their collection since the last census and they have stopped actively collecting the series.

One collector (359) has created a museum quality collection, far and away the finest ever assembled. It is an honor to list his efforts in these pages.

The complexion of our census has changed in other less obvious ways. In the January 1996 census there were only 9 collections with more than 100 marriages. Today there are 12. The average grade in 1996 for a reported collection ranged from 12-43. Today that average grade is from 15 to 46. The total number of dimes reported for all varieties has increased from 2,049 with an average grade of 27 (refer to Lot 2057 of the Logan Sale) to 2,591 with an average grade of 31.

It is obvious that we now have a number of serious dime collectors who are actively upgrading their collections. A few personal observations for specific varieties within the census are also warranted. Several varieties continue to remain extremely elusive -- '20 JR-12, '21 JR-2, '27 JR-10, '33 JR-3. Based on Russ Logan's personal notations, both the 1820 JR-12 and the 1833 JR-3 are now considered R-6's. Both, however, still have populations of fewer than 20 examples and miss the R-7 designation by just a few coins. They should be considered R-6+.

The always popular '29 JR-10 (curl base 2) has maintained its R-6 designation. One or two examples always seem to be available at major shows - though at rather lofty prices. This dime has the honor of possessing the lowest average grade of the entire Bust Dime Series - 9. In addition, there are only 8 reported in our census; however, approximately 20 examples are estimated by Bowers and Merena in the Logan Sale (Lot 2093). As a Red Book variety, the curl base 2 is comparable to the 1812/11 Lg 8 Bust Half Dollar (0-101).

This author is aware of 3 other examples of the 1829 JR-10 that were not listed in our census:

- 1) VG-8 listed by Dick Osborn in his coin list December 2002
- 2) G-6 owned by Steven J. Elwood
- 3) AU-53 - though unverified, this example was listed in the December 2002 PCGS Population Report

As for the 1821 JR-2, this variety remains the only business strike to maintain its R-7 status. There are 11 examples reported in our census as opposed to only 6 in the 1996 census. Knowing that an R-7 can have no more than 12 examples, we can anticipate in the next census that the 1821 JR-2 will be listed as a R-6.

Regarding the 1827 JR-10, it is a proof only issue. There are only 4 examples reported in our census, all impaired. Please refer to Mike Sherrill’s excellent article in issue 41 of our Journal for more comprehensive insight, where the 8 known examples are described. Although not listed in the census, the Starr/Logan example was recently offered by Superior Galleries Pre-Long Beach auction on February 24-25, 2003, but did not meet the consignor’s reserve.

Other varieties are still very tough either in grade or availability. For example the 1824 JR-2, a very elusive R-5, with only 13 examples reported has an average grade of 17. The 1827 JR-2 (R-5) with 14 reported has an average grade of 16. The 1830 JR-1 (R-5) with 22 examples has an average grade of 18. Tough remains tough!

We have also taken the liberty of printing the census separately so that it can be used as a handy reference, thus avoiding damage to the Journal itself. If you would like to have a copy, please send \$5 to JRCS at P.O. Box 135, Harrison, OH 45030-0135.

My sincere thanks go to Jason Meinhart without whose computer expertise this effort would have been virtually impossible. Although a non-numismatist, he possesses a kind heart and infinite patience.

Finally, our efforts are an evolving process. Suggestions for improvement are always welcome.

Archived Collections

Year	JR #	Rarity	LOVEJOY	SUBJACK	LOGAN	MAX	Year	JR #	Rarity	LOVEJOY	SUBJACK	LOGAN	MAX
1809	1	4	65	60	30	65	1821	7	2	63	55	40	63
								8	2	67	40	40	67
1811	1	3	64	60	50	64		9	2	64	40	40	64
								10	3	63	50	50	63
1814	1	3	65	60	20	65	1822	1	4	63	60	25	63
	2	3	64	12	30	64							
	3	2	65	60	60	65	1823	1	3	64	63	40	64
	4	2	65	40	50	65		2	5	63	50	45	63
	5	3	63	55	58	63		3	2	60	50	45	60
1820	1	4	65	45	50	65	1824	1	3	64	60	58	64
	2	3	67	40	40	67		2	5	8	20	30	30
	3	4	64	40	45	64	1825	1	4	60	55	53	60
	4	5	20	4	40	40		2	2	60	50	50	60
	5	4	64	40	30	64		3	3	60	40	40	60
	6	3	63	20	58	63		4	2	60	20	45	60
	7	2	60	35	55	60		5	5	64	60	50	64
1820	8	3	40	50	50	50	1827	1	2	60	45	30	60
	9	4	63	20	40	63		2	5	6	12	30	30
	10	3	63	60	50	63		3	1	65	40	55	65
	11	3	60	55	50	60		4	2	53	40	58	58
	12	6	63	20	60	63		5	3	60	20	40	60
	13	2	64	55	50	64		6	2	65	20	45	65
1821	1	2	63	45	50	63		7	3	64	40	50	64
	2	7	20		20	20		8	4	40	55	50	55
	3	4	60	35	30	60		9	5	20	55	58	58
	4	2	40	45	40	45		10	7	67		62	67
	5	3	60	55	30	60		11	2	63	40	45	63
	6	2	64	40	45	64							

Year	JR #	Rarity	LOVEJOY	SUBJACK	LOGAN	MAX
1827	12	1	60	40	40	60
	13	3	60	45	58	60
1828	1	2	63	50	50	63
	2	3	60	55	50	60
1829	1	4	60	50	45	60
	2	2	60	50	50	60
	3	4	60	60	50	60
	4	2	60	40	40	60
	5	4	50	45	50	50
	6	3	60	40	58	60
	7	1	55	45	45	55
	8	4	50	40	50	50
	9	4	63	20	50	63
	10	6	8	10	4	10
	11	4	60	45	58	60
	12	3	63	60	58	63
1830	1	5	8	20	25	25
	2	1	63	55	35	63
	3	3	64	60	60	64
	4	2	60	50	50	60
	5	2	60	45	40	60
	6	2	60	40	50	60
	7	4	63	40	30	63
	8	3	63	40	40	63
1831	1	1	60	55	50	60
	2	3	65	45	45	65
	3	1	64	40	40	64
	4	2	65	40	40	65
	5	1	60	50	64	64
	6	3	65	40	45	65
1832	1	2	60	40	45	60
	2	2	60	45	58	60
	3	4	65	25	45	65
	4	3	64	40	58	64
	5	2	64	45	58	64
	6	3	64	50	45	64
	7	3	63	40	64	64
1833	1	3	63	60	40	63
	2	5	62	62	50	62
	3	6	64	60	63	64
	4	1	60	60	58	60
	5	1	60	35	50	60
	6	1	63	50	50	63
	7	5	20	55	58	58
	8	5	55	55	50	55
	9	2	63	50	55	63
	10	3	45	20	50	50
1834	1	1	63	55	55	63
	2	3	65	40	50	65
	3	5	40	55	58	58
	4	3	63	50	45	63
	5	1	60	20	40	60
	6	2	60	60	55	60
	7	2	60	50	58	60
1835	1	1	60	50	40	60
	2	4	66	40	45	66
	3	2	63	60	55	63
	4	2	63	63	40	63
	5	1	60	20	40	60
	6	4	63	40	58	63

Year	JR #	Rarity	LOVEJOY	SUBJACK	LOGAN	MAX
1835	7	5	10	20	60	60
	8	3	60	20	40	60
	9	2	60	55	58	60
1836	1	3	63	50	50	63
	2	2	60	20	50	60
	3	3	60	60	50	60
1837	1	4	63	45	60	63
	2	3	64	60	50	64
	3	2	50	50	30	50
	4	1	64	64	55	64
			LOVEJOY	SUBJACK	LOGAN	
Varieties Owned			122	120	122	
Average Grade			57	44	47	

122 KNOWN DIE MARRIAGES

These archived collections listed in this section of the census represent three premier Capped Bust Dime Collections compiled by three of the authors of **Early United States Dimes 1792-1837**. These collections have subsequently been distributed to other collectors through public auction. Please be aware that the grades listed in the census were taken directly from the listings in the specific auction catalog. Also note that in the case of the Lovejoy collection in 1990, those dimes not graded by an independent grading service were assigned verbal descriptions by the auction house. This author has taken the liberty of assigning numerical approximations to these descriptions.

Lovejoy Proof Dimes

1821	JR-9	1831	JR-4
1824	JR-1	1832	JR-2
1827	JR-8	1834	JR-1
1827	JR-10	1834	JR-7
1828	JR-1	1835	JR-4
1829	JR-7	1836	JR-2
1830	JR-4	1837	JR-3
1831	JR-2		

REFERENCES:

Allen F. Lovejoy
Stack's 55th Anniversary Sale, Part I

The Allen F. Lovejoy Reference Collection of United States Dimes 1792-1945,
October 16,1990

William L. Subjack
United States Gold, Silver, and Copper Coins.

Stacks: 123 W. 57th St., N.Y., N.Y. 10019
December 2,3, 1992 (Part Two) Lot # 1001-1123

Russell J. Logan
The Collections of Russell J. Logan and Gilbert G. Steinberg

Bowers and Merena Galleries,
November 6-9, 2002

Apr-03

Draped Bust Dime Census

Year	JR #	Rarity	359	006	716	002	238	622	016	RPD	AVG	MAX
1792	1	5	63							4	63	63
1796	1	3	45	20	12	20				7	24	45
	2	4	50	8	12					5	23	50
	3	5	63	6	12	12				9	23	63
	4	4	58	15	8	15				6	24	58
	5	5	50	20	8					5	26	50
	6	3	60	30	15		12			6	29	60
	7	8	2							1	2	2
1797	1	4	62	25	20	20				6	32	62
	2	4	64	12	4	20	4			8	21	64
1798	1	3	61	20	20	15			15	7	26	61
	2	6	60	8	20			3		5	23	60
	3	5	63	30	4					5	32	63
	4	3	63	15	12	15	3		8	10	19	63
1800	1	4	58	30	3		8			5	25	58
	2	5	63	12	12	20			15	10	24	63
1801	1	4	63	20	8	20	6			8	23	63
	2	5	58	25	8	30		10	15	10	24	58
1802	1	8	45							1	45	45
	2	5	55	40	12	4				9	28	55
	3	5	50	3	15			20		9	22	50
	4	4	60	20	12	10	4			11	21	60
1803	1	7	45	3	3			4		6	14	45
	2	6	55	8	2			8		9	18	55
	3	4	63	8	20	20	4		15	7	22	63
	4	5	55	12	8	4		12		6	18	55
	5	7	20					6		3	13	20
1804	1	5	55	10	20		3			5	22	55
	2	5	50	30	45	4				5	32	50
1805	1	3	64	10	8	20	4	6		11	19	64
	2	2	64	40	45	12		3	40	12	34	64
1807	1	2	64	40	12	20	4			11	28	64
Varieties Owned Average Grade			359	006	176	002	238	622	016	32 KNOWN DIE MARRIAGES		
			32	28	28	18	10	9	6			
			55	19	14	16	5	8	18			

Apr-03

Capped Bust Dime Census

Year	JR #	Rarity	001	263	006	002	323	L32	716	622	238	960	578	1050	L13	016	100	RPD	AVG	MAX
1809	1	4	50	35	40	15	10	58	50	30	10	20	25	6		30	45	30	30	58
1811	1	3	40	40	45	25	20	58	40	30	12	20	53	12	25	20	45	33	32	58
1814	1	3	40	30	20	30	8	12	45	30	40		35	12	50	50	45	20	32	50
	2	3	40	35	40	40	10	10	50	45	40	25	20	12	50	30	15	20	31	50
	3	2	55	53	55	40	40	45	40	30	10	40	45	45	30	20	58	25	40	58
	4	2	30	45	40	40	25	45	18	40	15	8	55	25	30	40	25	22	32	55
	5	3	45	15	30	40	30	10	30	50	8	30	53	4	15	15	35	20	27	53
1820	1	4	40	45	50	40	20	25	40	30	8	6	30	20	58	30		22	32	58
	2	3	50	50	45	25	45	45	35	60	8	12	45	12	20	40	55	28	36	60
	3	4	40	30	30	40	6	25	40	40	35	10	10	10	40			22	27	40
	4	5	45	30	20	40	40	65	12	25	8	12	20	30	12			17	28	65
	5	4	45	20	10	25	12	35	40	45	8		4	12	15		20	17	22	45
	6	3	40	12	30	40	4	63	20	58	12	10	58	12	35	12	10	23	28	63
	7	2	55	12	35	25	35	50	45	20	8	15	35	8	45	20	50	27	31	55
	8	3	50	15	30	25	8	40	20	55	20	10	55	30	35	55	40	23	33	55
	9	4	25	30	30	25	8	53	15	35	12	12	55	20	35			18	27	55
	10	3	20	25	25	40	8	35	20	15	12	3	30	3		12	50	19	21	50
	11	3	45	35	40	25	50	64	35	50	12	20	20	12	25	35	45	22	34	64
	12	6	12	45	35	45	2	60	45	8					50			11	34	60
	13	2	55	12	35	40	12	64	20	20	20	20	20	12		40	20	27	28	64
1821	1	2	40	20	40	25	45	61	30	35	10	20	25	20	35	25	40	23	31	61
	2	7	25	12	25	20	4		25	4				8	12			11	15	25
	3	4	50	35	30	25	12	40	12	20	12	12	25	4	40			20	24	50
	4	2	55	8	30	40	30	62	45	35	6	12	58	20	40	12	30	25	32	62
	5	3	40	35	45	25	45	60	50	20	20	45	50	4	35	20	12	25	34	60
	6	2	50	8	30	20	6	45	55	20	12	40	58	3	25	50	58	27	32	58
	7	2	45	15	40	25	30	40	20	20	12	35	50	15		45	50	30	32	50
	8	2	40	25	35	25	20	64	20	55	12	15	40	12		10	40	25	30	64
	9	2	50	8	40	15	15	12	35	20	40	10	30	15	25	12	53	21	25	53
	10	3	50	12	50	25	3	50	20	25	12	12	40	12	20	20	15	16	24	50
1822	1	4	50	12	40	25	4	40	20	12	12	6	20	10		12	45	26	22	50
1823	1	3	50	35	30	40	8	12	12	50	20	12	30	45	20	50	45	29	31	50
	2	5	60	55	15	25	8	25	58	45	10	8	30	7		10	20	25	27	60
	3	2	50	30	40	40	6	55	20	20	8	30	40	30		30	61	35	33	61
1824	1	3	45	40	40	40	8	10	35	15	4	50	45	30		25	55	29	32	55
	2	5	20	10	30	45	8	35	8	8	8	3	18			10		13	17	45
1825	1	4	50	25	20	25	10	65	50	55	10	30	58			10	30	18	34	65
	2	2	40	40	30	25	10	60	20	35	12	25		15		30	20	30	28	60
	3	3	45	25	45	25	15	25	30	35	15	12	50	12		12		18	27	50
	4	2	40	35	25	50	3	30	40	30	8	15	50	40	45	20	8	22	29	50
	5	5	45	58	15	40	30	10	20	35	8	3	50	10		10	12	21	25	58
1827	1	2	60	45	30	25	6	12	40	30	55	2		15		35	12	13	28	60
	2	5	30	30	8	40	15	12	3	15	12	8	8					14	16	40
	3	1	45	8	45	40	60	45			12	6	58	12		15	40	17	32	60
	4	2	45	12	30	40	30	55	12	40	12	30	53	12	40	15	53	28	32	55
	5	3	35	10	30	40	10	10	50	30	8	8	40	12	40	45	30	24	27	50
	6	2	45	50	50	40	40	12	6	20	12	45	53	8		20		18	31	53

BUST DIME CENSUS

Year	JR #	Rarity	001	263	006	002	323	L32	716	622	238	960	578	1050	L13	016	100	RPD	AVG	MAX
1827	7	3	50	12	20	40	30	40	30	30	10	30	55	12		15		19	29	55
	8	4	45	30	30	25	12	25	12	58	8	12	63	8	25	12		19	26	63
	9	5	30	35	50	40	15	58	12	20	8	15	58	4	45	25		24	30	58
	10	7	40	6				8		30								4	21	40
	11	2	50	30	40	25	20	25	40	45	10	12	30	15		15	30	22	28	50
	12	1	45	12	40	25	6	25	30	45	12	12	62	40		12	20	20	28	62
	13	3	45	15	50	25	25	45	50	45	10	8	55	20	30	30	40	23	33	55
1828	1	2	60	15	35	25	40	40	35	45	12	12	58	25	45	40	50	34	36	60
	2	3	50	35	50	25	3		50	40	15	12	55	30		40	55	26	35	55
1829	1	4	45	45	35	40	4	63	63	55	3	20		12				17	35	63
	2	2	60	30	50	25	20	58	50		12	8	50	15	50	15	20	18	33	60
	3	4	50	50	50	25	20	45	20	40	6	40	53	30				23	36	53
	4	2	60	35	40	25	45	30	30	40	10	20	30	6	40	20		22	31	60
	5	4	50	45	45	40	40	45	10	55	4	10	50	8	45	15		18	33	55
	6	3	55	8	40	50	45	63	15	40	20	30	40	4			55	16	36	63
	7	1	60	30	45	45	10	40	30	35	12	30	58	25		20		20	34	60
	8	4	50	15	40	45	15	45	10	45	12	6	40	10	30			15	28	50
	9	4	60	12	20	40	3	40	20	35	10	30	61	40	45	10		21	30	61
	10	6	12	8	10	15	10	4	8	6								8	9	15
	11	4	60	40	45	25	8	58	10	58	20	10	20			10		14	30	60
	12	3	50	8	60	40	10	50	8	45	10	12	55	20	12			17	29	60
1830	1	5	10	45	20	25	12	45	20	20	5	4	12	12	15	8	12	22	18	45
	2	1	40	40	55	45	30	25	20	45	35	12	35	20				20	34	55
	3	3	40	35	60	50	30	55	62		20	30	50	45				16	43	62
	4	2	55	35	50	50	12	53	8	50	8	45	55	8	45			24	36	55
	5	2	40	20	45	45	8	35	20	40	12	40	40	15				22	30	45
	6	2	45	35	40	40	30	25	12	55	20	10	62	3	40			20	32	62
	7	4	50	35	40	40	35	63	40	30	10	10	20	8				15	32	63
	8	3	40	10	40	40	8	40	20	50	30	6	62	4	55	25	45	20	32	62
1831	1	1	50	30	55	40	8	40	58	60	8	50	61	30		10		27	38	61
	2	3	60	12	45	25	8	40	64	45	55	55	55	30			15	17	39	64
	3	1	45	12	40	25	12	58	60		45	30	40	30	55	25	15	24	35	60
	4	2	45	25	40	40	10	64	60	45	30	20	55	4	35			20	36	64
	5	1	50	35	50	40	35	58	45	40	10	55	62	25	45	15		21	40	62
	6	3	50	20	40	40	40	64	10	40	12	20	55	8	12			15	32	64
1832	1	2	60	30	40	25	8	55	60	30	8	20	15	15	40		55	20	33	60
	2	2	45	20	45	40	45	40	60	40	10	30	58	20	30			22	37	60
	3	4	40	55	25	40	20	58	45	50	20	55	10	12	45			20	37	58
	4	3	45	10	40	25	8	45	62	30	8	58	58	4		8	8	23	29	62
	5	2	60	15	45	50	53	64		55	12	25	55	8	40	20		20	39	64
	6	3	40	8	50	40	30	50	50	55	45	45	45	20				15	40	55
	7	3	45	45	40	40	40	61	61	50	45	15	62	10	35	15	25	19	39	62
1833	1	3	40	35	60	40	30	63	50	12	12	50	50	7	45			26	38	63
	2	5	60	18	62	8	8	58	12	50	50	40	10	10	55			16	34	62
	3	6	60	10	50	20	15	63	8	15		20	53					11	31	63
	4	1	58	12	30	40	50	62	8	15	20	20	63	12	60			29	35	63
	5	1	45	15	50	25	50	25	20	45	15	58	61	8		15	45	24	34	61
	6	1	40	12	45	25	10	55	20	55	10	8	63	12	12			19	28	63
	7	5	25	6	50	40	15	25	35	20	6	8	61	6				20	25	61
	8	5	60	45	45	40	12	50	12	50	50	30	58	40	35			20	41	60
	9	2	60	20	55	40	30	58	40	45	10	55	45	25	35		12	23	38	60
	10	3	45	30	45	40	10	63	30	40	15	8	55	40	40		58	20	37	63

Year	JR #	Rarity	001	263	006	002	323	L32	716	622	238	960	578	1050	L13	016	100	RPD	AVG	MAX
1834	1	1	55	8	40	25	40	55	40	45	15	25	58	10		8	20	23	32	58
	2	3	50	30	45	40	40	65	63	50	12	12	63	20	45	8	20	29	38	65
	3	5	40	45	30	8	35	58	20	20	12	12	40	4				20	27	58
	4	3	45	15	45	40	30	62	20	45	12	8	40	8	25		10	22	29	62
	5	1	45	20	40	40	45	40	50	45	12	35	40	12				25	35	50
	6	2	60	35	50	40	8	65	20	63	12	25	30		30	8	35	24	34	65
	7	2	60	35	30	40	20	58	40	58	45	30	55	12		15		24	38	60
1835	1	1	40	10	45	25	30	40	40	20	12	50	35	10	50		53	24	33	53
	2	4	50	12	40	40	8	35	40	55	15	40	50	15	45		40	20	35	55
	3	2	45	35	45	40	8	65	8	62	8	40	50		50	50	15	29	37	65
	4	2	60	40	40	40	20	40	60	55	10	20	55	40	40	30	12	20	37	60
	5	1	50	10	50	40	20	25	15	12	10	40	45	8	55	15		22	28	55
	6	4	40	35	50	40	6	63	12	55	10	30	18	4			30	17	30	63
	7	5	55	45	40	40	10	60	8	50	15	8	20	12	12			22	29	60
	8	3	55	12	30	25	8	64	64	20	8	8	40	12	40			16	30	64
	9	2	45	12	55	25	45	40	62	50	8	35	45	40	45		15	25	37	62
1836	1	3	45	35	50	25	8	45	50	15	8	58		12	12	12		24	29	58
	2	2	45	45	40	40	58	66	60	45	15	20	58	30	30	15	35	24	40	66
	3	3	45	40	50	25	50	64	60	15	12	25	50	20	30	25		27	37	64
1837	1	4	30	55	45	50	4	10	20	62	10	6	45	6	40			17	29	62
	2	3	60	8	45	25	15	55	35	55	15	12	50	8	40			20	33	60
	3	2	45	8	30	40	8	45	15	40	20	10	40	40	45	12		22	28	45
	4	1	45	20	40	25	12	10	40	30	12	25		15		20		17	25	45
			001	263	006	002	323	L32	716	622	238	960	578	1050	L13	016	100			
Varieties Owned			122	122	121	121	121	120	119	118	117	116	113	112	76	74	64			
Average Grade			46	26	39	34	21	44	32	37	15	22	44	16	36	22	33			

122 KNOWN DIE MARRIAGES



1827 JR-9 R-5
Bowers & Merena Logan Sale
Lot 2071

Apr-03

Capped Bust Dime Census by Grade

Year	JR #	Rarity	AG/G	VG	F	VF	XF	AU	UNC	TOTAL
1809	1	4	2	2	11	9	2	3	1	30
1811	1	3	1	1	5	16	7	2	1	33
1814	1	3		1	4	6	6	3		20
	2	3		3	6	5	4	2		20
	3	2	2	2	3	5	9	4		25
	4	2	3	1	3	8	6	1		22
	5	3	2	4	4	6	2	2		20
1820	1	4	2	1	4	8	5	2		22
	2	3		2	8	9	5	3	1	28
	3	4	1	6	3	6	6			22
	4	5	1	2	5	5	3		1	17
	5	4	2	2	4	6	3			17
	6	3	1	3	7	6	2	2	1	22
	7	2		4	4	11	5	3		27
	8	3		3	4	10	2	4		23
	9	4		2	4	9	1	2		18
	10	3	2	3	4	6	3	1		19
	11	3		1	3	12	3	2	1	22
	12	6	1	1	2	2	3	2		11
	13	2		1	9	12	3	2		27
1821	1	2		2	2	14	4		1	23
	2	7	2	2	3	4				11
	3	4	2	1	5	9	2	1		20
	4	2		3	6	8	3	3	2	25
	5	3	3	2	4	9	4	2	1	25
	6	2	3	4	5	9	2	4		27
	7	2		4	9	10	4	3		30
	8	2	2	2	4	7	7	2	1	25
	9	2	1	3	9	4	2	2		21
	10	3	3	1	4	4	1	3		16
1822	1	4	2	6	6	7	3	1	1	26
1823	1	3	2	5	8	8	3	3		29
	2	5	4	7	5	4	2	2	1	25
	3	2	2	7	6	12	6	1	1	35
1824	1	3	2	10	6	4	5	1	1	29
	2	5	1	5	1	5	1			13
1825	1	4		3	1	9		4	1	18
	2	2	1	6	9	11	2		1	30
	3	3	2	1	5	7	2	1		18
	4	2	2	5	4	5	4	2		22
	5	5	5	5	4	3	2	2		21
1827	1	2	1	1	4	4	2		1	13
	2	5	3	4	4	2	1			14
	3	1	1	3	3	2	5	2	1	17
	4	2	1	4	8	8	4	3		28
	5	3	2	6	3	7	4	2		24
	6	2	2	2	3	4	5	2		18
	7	3	2	2	4	6	3	2		19
	8	4		4	6	6	1	1	1	19
	9	5	5	5	3	6	2	2	1	24
	10	7	1	1	1	1	1			4
	11	2	1	4	6	6	4	1		22
	12	1		2	5	7	5		1	20
	13	3	1	4	4	6	4	3	1	23
1828	1	2	2	3	9	10	7	1	2	34
	2	3	2	6	3	7	3	4	1	26
1829	1	4	3		3	4	4	1	2	17
	2	2	2	3	3	4		5	1	18
	3	4	2	1	6	6	3	5		23
	4	2	3	2		11	5		1	22
	5	4	2	4	2	1	6	3		18
	6	3	2	1	1	2	4	5	1	16

Year	JR #	Rarity	AG/G	VG	F	VF	XF	AU	UNC	TOTAL
1829	7	1	3	2	3	6	3	2	1	20
	8	4	2	2	3	1	6	1		15
	9	4	2	4	3	5	4	1	2	21
	10	6	2	4	2					8
	11	4		5		3	3	2	1	14
	12	3		5	3	2	2	3	2	17
1830	1	5	3	6	6	5	2			22
	2	1		5	4	6	4	1		20
	3	3		3	1	5	2	3	2	16
	4	2	8	4	2	1	1	8		24
	5	2		9	3	4	6			22
	6	2	1	2	4	5	5	2	1	20
	7	4	1	4	1	4	3	1	1	15
	8	3	3	3	1	3	6	3	1	20
1831	1	1	2	5	6	5	3	4	2	27
	2	3	1	2	3	2	4	3	2	17
	3	1	3	1	5	8	4	2	1	24
	4	2	2	1	1	5	7	1	3	20
	5	1		1	3	5	4	6	2	21
	6	3		2	4	2	4	2	1	15
1832	1	2	2	2	5	5	1	3	2	20
	2	2	2	3	2	4	8	2	1	22
	3	4	5	2	2	3	4	4		20
	4	3	2	10		3	3	4	1	23
	5	2		2	3	3	6	4	2	20
	6	3		2	1	3	5	4		15
	7	3		3	2	4	6	1	3	19
1833	1	3	1	1	4	8	5	5	2	26
	2	5		4	3	2	1	4	2	16
	3	6		2	2	2	1	2	2	11
	4	1	6	6	5	6	2	2	2	29
	5	1	1	4	4	7	4	3	1	24
	6	1	2	6	2	2	3	3	1	19
	7	5	4	6	1	6	1	1	1	20
	8	5	3	1	4	3	4	4	1	20
	9	2		4	4	7	4	3	1	23
	10	3	1	3	1	2	9	3	1	20
1834	1	1	2	6	2	6	4	2	1	23
	2	3	2	6	5	5	5	3	3	29
	3	5	3	6	3	4	3	1		20
	4	3	1	5	3	6	5	1	1	22
	5	1	1	7	3	4	7	2	1	25
	6	2	3	4	2	5	5	2	3	24
	7	2	1	3	6	7	3	3	1	24
1835	1	1	1	3	5	7	5	3		24
	2	4		1	5	4	7	3		20
	3	2		4	7	3	8	5	2	29
	4	2		1	3	6	6	2	2	20
	5	1	2	3	6	5	3	3		22
	6	4	2	3	2	4	3	2	1	17
	7	5	2	6	3	3	5	2	1	22
	8	3		4	2	5	2	1	2	16
	9	2	1	1	3	7	7	4	2	25
1836	1	3	1	4	5	8	2	4		24
	2	2		5	2	5	6	4	2	24
	3	3	1	3	6	7	3	5	2	27
1837	1	4	4	4		2	3	3	1	17
	2	3	2	4	5	2	2	4	1	20
	3	2	1	5	4	4	6	2		22
	4	1		2	3	8	3		1	17

Total reported in all grades 2,591



Early U.S. Minting Methods

Part I: Die Forging and Hardening

Craig Sholley

Many collectors of early U.S. coinage believe that “poor” die steel was a major problem for the early Mint. According to conventional wisdom, the steel of this time was of low quality and caused the cracking and sinking that resulted in low die life.

Taxay’s quotation of a 1796 record from the Congressional Record in which Mint officials used poor steel as an excuse for the Mint’s continuing problems along with some Mint records in the National Archives do show that the Mint was preoccupied with the steel as the source of their problems. However, other historical records show that the steel the Mint was using was exactly the same as that being successfully used by the European mints. So, if the problem wasn’t the steel, then what was it? The problem, quite simply, was the inexperience of the Mint personnel in forging and hardening dies.

The proper forging and hardening of a “die body” was no simple task. Dies had to withstand repeated heavy impact and enormous pressure. Creating a forging to withstand these forces required a great deal of practical experience. Not only were there none of the “ready-to-use” steel products so common today, there were also no metallurgical texts on the processes or methods, the scientific principles had not been discovered yet! The only way to produce a die body was to hand-forge it from raw steel billets and then harden and temper it using methods that had been learned by experience but not fully understood.

Unfortunately, at its inception the Mint had no one in its employ with any real experience in forging dies. In 1791, then Secretary of State Thomas Jefferson had tried to hire the noted Swiss die-sinker and engraver Jean-Pierre Droz, but in the end Droz declined. Jefferson then sought to hire other experienced craftsmen from England or France, but this also fell through and in the end the Mint was left to fend for itself.

While forging steel is nothing more than heating the steel to “red hot” and hammering it into shape, it does require a good deal of experience. The forging had to be done quickly as red-hot steel will decarburize (lose carbon), resulting in a softer steel that wears quickly. The forger also



needed to be careful not to leave any seams as these would cause cracking in hardening or use.

At least one of the early officials appreciated the experience problem. In 1798 and again in 1799, then Mint Director Elias Boudinot remarked in letters to Matthew Boulton (who was supplying copper planchets for coining) about both the lack of experience and the difficulty of making dies, calling die manufacture the “greatest difficulty I have experienced”.

This lack of experience was especially troublesome during the first six years. At this time, the Mint used a type of steel known as “blister” steel. Blister steel was made by the “cementation” process: wrought iron bars were packed in charcoal, sealed in an air tight box, and heated to a red heat in a furnace for several days, followed by slow cooling. The carbon slowly diffused into the wrought iron creating steel. The reactions caused by this process resulted in a bar with a blistered surface, hence the name. The resulting steel bar was not homogenous; it varied in carbon composition and structure throughout the bar and often there were areas of unconverted iron. Additionally, the wrought iron from which it was made often contained defects such as slag inclusions and air pockets.

Despite the problems, blister steel had been successfully used for coining dies in Europe for well over 200 years with the quality of the British and French coinage of the 1700s to 1800s attesting to the fact that it was adequate to the task when properly forged. To use this steel, the Europeans had developed the rather laborious practice of cutting small pieces of blister steel off the bar, inspecting them, and then forge-welding the acceptable pieces into a die body.

The Mint was not alone in its problems. In fact, even Matthew Boulton experienced serious problems with blister steel when he started his contract coinage business. Boulton, while an excellent mechanic, had no experience as a die forger and reported exactly the same problems that the Mint was experiencing!

Forging the die body was not the only die-making problem the Mint would encounter. Once engraved, the die still had to be properly hardened and tempered. These processes, while again sounding simple, were likewise difficult to master.

“Heat-hardening” steel was a centuries-old process probably discovered by accident shortly after the development of steel itself. Hardening involved nothing more than heating steel to a “cherry red” and then rapidly quenching



Hand engraving the hub.

(cooling) it in a large vat of water. The heating caused changes to the crystal structure of the steel and the rapid cooling “froze” the steel into that structure. The resulting steel was now very hard but unfortunately too brittle for use and it had to be “tempered” by heating to it a deep yellow or blue color and allowing it to cool naturally. The tempering again caused some changes to the steel’s structure, eliminating most of the brittleness while still retaining most of the hardness.

Hardening and tempering presented their own unique problems. If the steel was not vigorously swished about during quenching it would not harden evenly. And if it was heated to too high a temperature or for too long, the result would be a softer steel which would not stand up under striking.

Experience in forging and hardening is exactly what the Mint was lacking in its earliest days and it showed. During the first two years of regular operation (1793 and 1794), die life was abysmal, averaging less than 20,000 strikes per die with the dies often fracturing during hardening or immediately on use, or “sinking” as the pressure of striking “pushed” the improperly forged and hardened die.



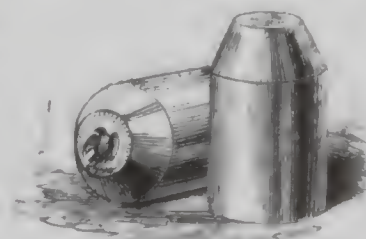
Sinking letters or stars into the working die.

Help did arrive in 1795 with the hire of Adam Eckfeldt.

While not a die forger, Eckfeldt was an accomplished blacksmith and had at least some of the sorely lacking experience in forging and hardening of steel. And, Eckfeldt’s experience paid off. In his first year as die forger and hardener, he virtually eliminated fracturing during hardening and nearly doubled the die life.

Despite the improvements, Eckfeldt’s lack of direct experience with dies still showed. Die life remained quite low, averaging just 40,000 strikes for the half cent and cents and about half that for the half dollars. Cracking and sinking in use also continued to remain a serious problem. Nonetheless, the Mint was thrilled that its most serious problem, the fracturing of die during hardening, had been solved. Although the die life was still low and the dies frequently cracked or sunk in use, at least they could get some use out of each die made.

In February of 1826 an interesting article revealing quite a bit of detailed information on the Mint’s practices and problems was published by a “Mr. K” (presumably then Chief Engraver William Kneass) in *The Franklin Journal*, Vol.1, No.2, pages 97 to 99:



DIES.

Artist rendition of completed dies

ON HARDENING STEEL DIES at the First United States Mint

Mr. Editor, - I avail myself of the opportunity you offer, to recording your useful repository, the observations made by ingenious practical mechanics, in the prosecution of their respective arts. It will no doubt comport with your views to give merit to its just due, by stating the processes already known, as well as to make the knowledge of them more extensive.

The management of steel for nice purposes in the arts, is of vast importance, and requires considerable practical skill; it has consequently been made the subject of numerous experiments, which within the course of a few years have resulted in the discovery of many improvements. The general method of hardening this metal, is to heat it red hot, and then plunge it into cold water, and sometimes into mercury, in order to reduce its temperature as quickly as possible; to effect this cooling with the requisite rapidity, the article when plunged, is moved about, in order to expose it to new surfaces of the cold fluid. This method answers in general, with small or thin pieces of steel, when the mass is considerable; in this case, the article frequently breaks in the operation, or is hardened at the edges only; from this cause much inconvenience, and great loss, have frequently resulted to those interested in the hardening of steel dies, for striking medals, coins, &c. This has been frequently experienced in the mint of the United States; the dies after being completely finished, excepting the process of hardening, were very often destroyed in this attempt; or if they passed safely through this ordeal, were found to be incapable of sustaining the severe and repeated blows to which they, in their use, were subjected. An intimate friend of the writer, it is believed, was the first person who succeeded in obviating these difficulties so completely, that not the slightest danger is now apprehended from the process.

Mr. Adam Eckfeldt, the present chief coiner in the mint, a very ingenious practical mechanic, whose original profession was that of a smith, was employed in the infant state of the establishment, to manage this department. Aware that the cause of the frequent failures in the process alluded to, was the sudden contraction of the steel on the outside, whilst the inside was in a heated and expanded state, causing the outer hardened and brittle coat of steel to crack or burst, he adopted the following expedient. He caused a vessel holding 200 gallons of water, to be placed in the upper part of the building, at the height of 40 feet above the room in which the dies were hardened; from this vessel, the water was conducted down through a pipe of one inch and one quarter in diameter, with a cock at the bottom, and nozzles of different sizes, to regulate the diameter of the jet of water. Under one of these was placed the heated die, the water being directed on the center of the upper surface. The experiment was first tried in the year 1795, and the same mode has been ever since pursued, without a single instance of failure.

By this process the die is hardened in such a way, as to best sustain the pressure to which it is to be subjected, and the middle of the face, which by the former process was apt to remain soft, now becomes the hardest part. The hardened part of the die so managed, were it to be separated, would be found to be in the form of a segment of a sphere, resting in the lower soft part as in a dish; the hardness of course gradually decreasing as you descend towards the foot. Dies thus hardened, preserve their forms until they are fairly worn out.

I am aware that the above mode is now in frequent use, as Mr. Eckfeldt never wished to keep it secret; a

gentleman of the mint communicated the process to a friend in Birmingham, England, where, it is believed, it was not previously known.

Should you think the above information worth publishing, you will probably receive some other communications, containing improvements effected by the same gentleman.

Yours very respectfully,
K.

Despite the author's assertions, Eckfeldt did not invent this hardening process. In the previously mentioned 1798 letter, Mint Director Elias Boudinot asked Matthew Boulton for help in the hardening process. While Boulton's reply no longer exists, in a 1799 letter Boudinot thanked him for the instructions, noting that "we have hitherto practiced the same principles". So, rather than Eckfeldt inventing the hardening process, the method was actually common knowledge.

This article does, however, provide important insights into the Mint's early problems with die manufacture and their misconceptions regarding the cause of the problems. While today this is easy to see, again it must be realized that there was no metallurgical knowledge at the time; they literally had no way of knowing what was really causing the failures.

Although the immersion hardening process was the best method to achieve a uniform and higher hardness, it placed a very severe shock on the forging. Thus any internal defects (forging seams or cracks, voids, etc.) could cause the die to fracture. The problem of the dies cracking and bursting during the hardening process was therefore due to hidden defects in the die rather than the misconception of the cooled surface contracting around the hot and expanded interior.

However, the "spray process" of hardening the die would have placed far less stress on the die and allowed a die with even some relatively significant defects to make it through the hardening process. The die would later fail in use, but at least it could be used for some amount of time. And while it did allow the Mint to get at least some use out of poorly forged dies, the downside was that the spray process would cause even good dies to eventually crack in use.

Spraying the die face with a jet of water unfortunately produced a variation in hardness along the length and across the face of the die. The "Mr. K" letter illustrates just such a variation across the die face, stating that: "the middle of the face, which by the former process was apt to remain soft, now becomes the hardest part. The hardened part of the die so managed, were it to be separated, would be found to be in the form of a segment of a sphere". This shows that there was a drastic variation in both the depth and degree of hardness from the center of the die face to the edge. This variation created a "stress point" that directly contributed to the arcing cracks through the stars and lettering often seen on early U.S. coinage.

In fact, Franklin Peale, upon returning from his visit to the European mints in 1833, reported that the spray process was not used in the British Royal Mint having been tried at one time and then abandoned in favor of the process of complete immersion. Eventually, the Mint realized the problem with this hardening process and returned to using immersion.

Although it's now clear that the Mint's major problem was forging and not the steel, this is not to say that blister steel was the best steel for dies. There were other types of steel available, one of which was the very superior "English cast steel".

English cast steel was literally the best steel of its time. The process of melting and casting steel was developed by the Englishman Benjamin Huntsman who had his own problems with blister steel. In this process, blister steel was melted in a crucible and then cast in molds. The process of melting the steel eliminated the problems found in blister steel - it rid the steel of unconverted iron, "air pockets", and slag inclusions and "homogenized" the carbon content. The result was a very uniform and "clean" steel. The Mint eventually discovered this steel, but it did take some time.

In the same 1798 and 1799 letters previously mentioned, Boudinot also requested that Boulton supply his "best steel for dies". A half ton was requested in 1798 and a ton in 1799. From this, some researchers have concluded that Boulton supplied "die steel" to the Mint and this steel resulted in the increased die life seen in the 1800s.

However, the Mint's account books show that Boulton never supplied steel as there is no record of a payment to him for steel. This should really come as no surprise since the British manufacturers, realizing they had a monopoly on the best steel, strictly controlled its export. Not wishing to anger his own suppliers by infringing on their business, Boulton simply never responded.

But, the account books do show purchases of cast steel from local merchants. From late 1798 through 1800, the Mint purchased various types of steels from these merchants in an effort to increase die life. As a result of the experiments, the Mint finally realized the superiority of the cast steel and from late 1801 on exclusively used this type of steel for dies.

The switch in steels did provide an immediate increase in die life. By 1801, die life for cents had quadrupled to about 140,000 strikes per die. However, cracking and sinking in use, although reduced, continued to be a problem. While much



Actual dies from the US Mint in Philadelphia

of the cracking can now be attributed to the spray hardening process as previously discussed, the sinking was solely related to forging.

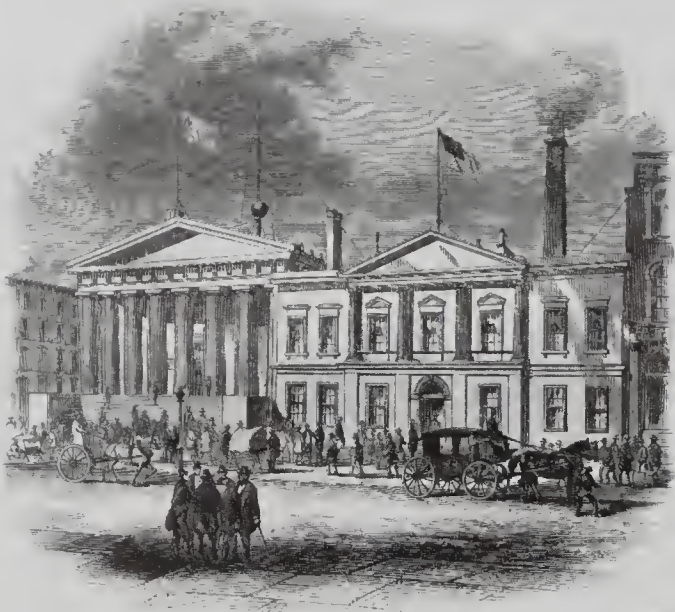
Although the melting and casting did eliminate the defects found in blister steel, cast steel presented its own unique problems. When molten steel cools in a mold, there is a variation in grain size (and therefore properties) across the billet. Also, dissolved gases come out of solution forming voids and a "pipe", or shrinkage cavity, develops in the center of the billet as it cools. If not properly forged, these defects would cause cracking and sinking problems in use. Boulton experienced exactly this problem, stating that his dies did "not stand up as well as is necessary". It took him several years to discover a forging technique to eliminate it.

As Eckfeldt became more and more experienced in forging this steel, die life continued to increase, reaching more than 300,000 strikes per die for both cents and half dollars by the early 1830s. Concurrently, serious die fractures were virtually eliminated and from the late 1810s on, the cracking was generally confined to arcing cracks through the stars and lettering. The Mint now had the experience in die forging and hardening which it had so sorely lacked at its inception.

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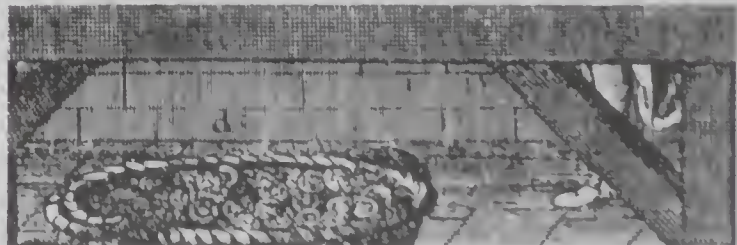
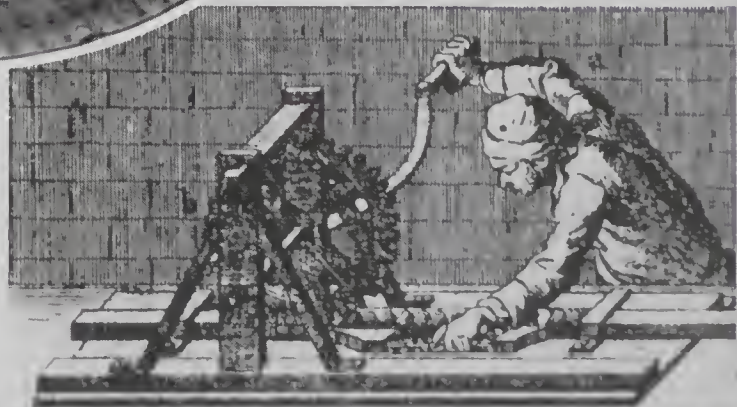
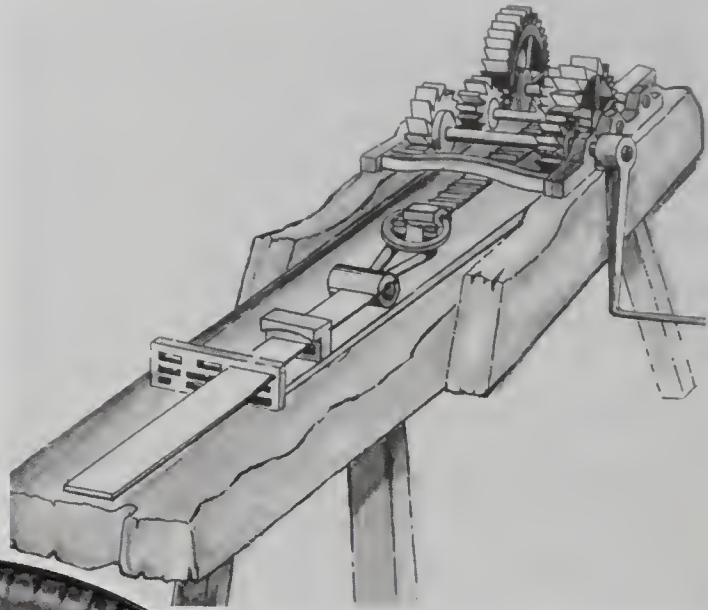
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